PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
Ehrner & Delmar Patentbyrå AB
P.O. Box 10316
100 55 STOCKHOLM
SVERIGE

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	17-03-2005
Applicant's or agent's file reference 72423PC/SH	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE2004/001758	29.11.2004	29.12.2003

International Patent Classification (IPC) or both national classification and IPC
E21B 21/08, E21B 44/00

Applicant
Atlas Copco Rock Drills AB et al

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further opinions, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/SE
Patent- och registreringsverket
Box 5055
S-102 42 STOCKHOLM

Facsimile No. +46 8 667 72 88

Authorized officer
Ingemar Hedlund / MRo

Telephone No. +46 8 782 25 00

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language, _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ in written format

      ☐ in computer readable form

   c. time of filing/furnishing

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in computer readable form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-21	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-21	NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims		NO

2. Citations and explanations:

The invention concerns a method and a system for controlling power consumption during a rock drilling process and a rock drilling apparatus therefore. The rock drilling apparatus includes main power supply means for supplying power for the rock drilling process, which includes at least the sub-processes of percussion and/or rotation and flushing, the method comprising the steps of:
- adjusting the flush power at least partly as a function of hole dept, and
- controlling at least the percussion power and/or rotational power and the flush power such that the total power consumption of each sub-process is controlled.

The object of the invention is to solve the problem of controlling the power consumption during a rock drilling process in such a way that the power output of each sub-process is controlled so that the total power consumption is kept at or below a predetermined level.

Cited Document:
D1: US 6637522 B2

Document D1 is considered to represent the closest prior art. D1 describes an apparatus and method for substantially continuously drilling and disposing of drill cuttings and dust to minimize airborne contamination while providing protection against overload using enhanced computer control. A flushing mechanism utilizes vacuum or pressurized water to create a bailing fluid flow for flushing the cuttings and dust from the drill hole for disposal.

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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Box V.

A transducer monitors at least one first parameter of the bailing fluid flow, and a sensor may also monitor at least one second parameter of a flow of a driving fluid under pressure for feeding the drill stem and bit into the earth. A controller is utilized to regulate the rate of feed and/or driving of the stem and bit dependent on the levels of the parameters being monitored.

The controller can be used to program and adjust the threshold level of the pressure corresponding to the approaching overload so that maximum drilling efficiency is obtained for any particular type of mining, or related operation, being performed. The window of operation is set to ensure substantially continuous drilling and eliminate false signals of approaching overload. The upper and lower thresholds of the gauge pressure in the flushing mechanism can be varied to establish the optimum rate of feed and/or drilling rotation. Since maximum drilling efficiency is obtained it is considered obvious to the person skilled in the art that the power consumption becomes optimum.

Consequently, with the background of D1, each of the method, the system and the apparatus according to claims 1, 11 and 21 is considered obvious to a person skilled in the art and therefore lack inventive step.

The remaining claims are considered to involve particular detail executions obvious to a person skilled in the art. Therefore, the invention according to these claims is not considered to involve an inventive step.

The invention is novel and is industrially applicable.